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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,216	11/26/2003	Takehisa Takoshima	02008.134001	2554

7590 06/21/2006

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EXAMINER
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CAZAN, LIVIUS RADU

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/723,216	TAKOSHIMA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Livius R. Cazan	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/26/03, 4/26/04, 7/12/04, 9/9/05, 5/3/06</u>                            | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 96 and 98, mentioned on page 14, para. [0043]. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The specification is replete with grammatical errors, thereby making it difficult to understand the disclosed invention. The specification should be carefully revised so as to be clear and concise. It would appear the specification is based on a machine translation of a foreign document. Some examples of errors present in the application are listed below:

- On page 1, para. [0002], line 5, no application number is recited; likewise in line 9; Japanese patent applications are mentioned but not identified
- On page 3, para. [0010], line 2, "includes" should read --include--
- On page 4, para. [0013], line 4, "divided" should probably read --is divided--
- On page 6, para. [0024], line 2, it is unclear what is meant by "at the different height"; likewise in line 4
- On page 8, para. [0029], lines 1 and 2, it would appear "Continuously, the ... is heated." should read --The deposited amorphous alloy layer 60 is continuously heated.--; in lines 2 and 3, it would appear "The amorphous alloy ... transition temperature" should read --Preferably, the amorphous alloy layer 60 is heated to a temperature higher than the glass transition temperature--; in line 6, it is unclear what is meant by "supercooled liquid temperature area" (see corresponding rejection under 35 U.S.C. 112, second paragraph)
- On page 9, para. [0031], line 5, "other metal layer" should probably read --another metal layer-- or --other metal layers--
- On page 10, para. [0035], lines 3-5, the phrase "by heating and bonding ... temperature area, and the" is confusing, since it basically states that heating the alloy to a certain temperature allows it to be heated to that temperature.

- On page 11, para [0036], line 2, "constituting" should read --constitutes--; on line 4, "XeF<sub>2</sub>" should read --XeF<sub>2</sub>--; in para [0037], line 6, it is unclear what is meant by "does not almost occur"
- On page 13, para. [0043], line 10, "angel" should read --angle--
- On page 14, para. [0046], line 1, "sacrifice" should read --sacrificial--; in para. [0048], lines 11 and 12, "chrome" and "titan" should read --chromium-- and --titanium--, respectively

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the phrase "supercooled liquid temperature area" (lines 8-11, 16, and 17) renders the claim indefinite, since, as claimed, it is unclear whether the amorphous alloy layer has a region which is a supercooled liquid, or if a different meaning is intended. It would appear that the Applicant might be referring to a supercooled liquid state, i.e. a temperature range for which the alloy material is a supercooled liquid. This is the interpretation used for examination purposes. Likewise in claims 6 (line 3), 9 (lines 6, 8, and 9), and 11 (line 3). Also the phrase "heating at" (claim 1, line 9) would suggest that the "area" in question is a physical location, i.e. a portion of the alloy layer.

The phrase "preparing ... alloy layer" (lines 12 and 13) renders the claim indefinite, since, as claimed, it would appear that the scope of transferring a signal is to somehow hold the amorphous layer.

Regarding claims 6 and 11, it is unclear what exactly is being heated. As claimed, it would appear that the alloy layer has a supercooled liquid portion which is heated, which conflict with the interpretation that the phrase "supercooled liquid temperature area" refers to a "supercooled liquid state".

Regarding claims 8 and 13-18, it is unclear what is meant by "on said probe pin forming substrate divided". It is believed the phrase might be intended to read --on said divided probe pin forming substrate--.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 9 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hata et al. ("Fabrication of Thin Film Metallic Glass and its Application to Microactuator"; hereinafter "Hata").

Hata discloses:

- forming an amorphous alloy layer of a predetermined shape on a probe pin forming substrate for forming said probe pin, wherein said amorphous alloy layer has a supercooled liquid temperature area;

- heating said amorphous alloy layer at said supercooled liquid temperature area;
- cooling said amorphous alloy layer; and removing at least a part of said probe pin forming substrate in a state where said amorphous alloy layer is cooled at a temperature lower than said supercooled liquid temperature area.

See page 100, Figure 4; see section 3.2 and 3.3.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-8 and 10-18, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Khandros et al. (WO/1997/044676; hereinafter "Khandros") in view of Hata.

Khandros discloses:

- Preparing a probe pin forming substrate (202 in Figs. 2A-2J and the figure below) for forming a plurality of probe pins, as per claim 1 (see Figs. 5 and 6. see section "Probe Applications", pp. 36-38), by forming a probe pin groove part (see Figs. 2A-2J; see region comprising portions B, C, and D in the figure below) having a bottom surface (B below) substantially parallel to a surface (A below) of said probe pin forming substrate and an

inclined surface (C below) having a first end (C1 below) extending from said bottom surface (B) and forming an angle with the bottom surface (B) and a second end (C2 below) extending from said surface (A below) of the probe pin forming substrate (202 below), as per claim 2; the protrusion forming groove part is formed using anisotropic etching (clearly, from Figs. 2A-2J, the etching is anisotropic; see section "Fabricating the Contact Structure", pp. 21-30, in particular ln. 4 on page 24), as per claim 3

- Forming an alloy layer (alloy layer 256 in Fig. 2H; see page 28, lns. 10-15) deposited from the bottom surface (B below) over the inclined surface (C below) and said surface (A below) of the probe pin forming substrate (202), as per claim 1; a protrusion forming groove part (D) is also formed at an area where the alloy layer is formed on the bottom surface, as per claim 4, and alloy is formed at said protrusion forming groove part (see Fig. 2H); a conductive layer may also be formed over the alloy layer, as per claims 5 and 10 (see conductive layers 254 and 252 in Fig. 2H)
- Preparing a holding substrate (electronic component 408, Figs. 4A-4C) for holding the alloy layer, the holding substrate comprising a transfer line (terminals 406, Figs. 4A-4C) for transferring a signal, as per claim 1
- Dividing the alloy layer into portions corresponding to individual probe pins as per claims 8, 13-18 (see page 29, lns. 15-30)
- Forming a joining member for joining the alloy layer and the transfer line, as per claims 7 and 12 (see stud 472 in Fig. 4E)

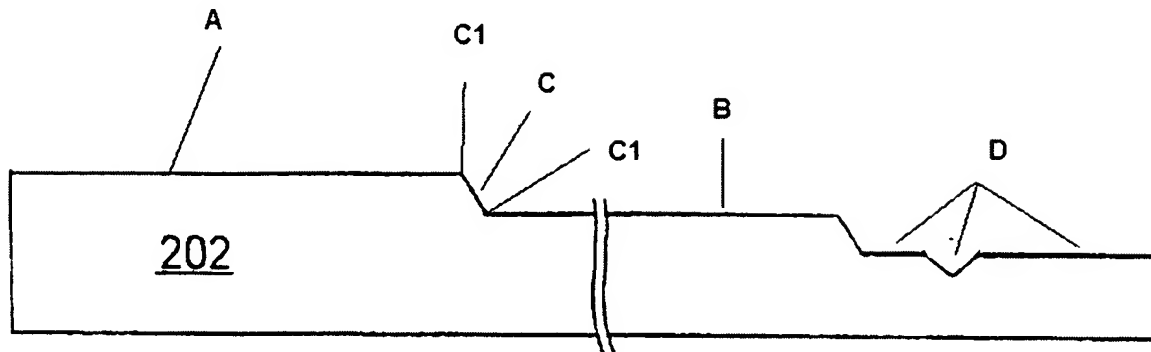


- Joining a part of the amorphous alloy layer and the transfer line by heating, as per claims 1, 6, and 11, or joining individual pins to transfer lines, as per claims 7 and 12 (see page 32, Ins. 5-15; clearly, soldering/brazing involves heating)
- Removing at least a part of the probe pin forming substrate, as per claim 1 (see section "Removing the Sacrificial Substrate", pp.30-31; see page. 32, Ins. 30-32)

Khandros does not disclose the use of an alloy that is amorphous and has a supercooled temperature state and heating the amorphous alloy layer to the supercooled liquid state followed by cooling to a temperature below the supercooled liquid state, as in claims 1, 6, and 11.

Hata teaches the use of amorphous alloys of metallic glass (TMFG) to form microstructures such as micro beams (i.e. probe pins). In order to decrease internal stress present in the micro beams due to the deposition process (i.e. sputtering), they are heated to the supercooled liquid state and thereafter cooled to a temperature lower than the supercooled liquid state, so as to remove internal stress (see Abstract; see sections 3.2 and 3.3).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to employ an amorphous alloy as taught by Hata and to heat it to a supercooled liquid state and thereafter cool it below this temperature, in order to remove internal stress from the alloy material, as taught by Hata.



### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Livius R. Cazan whose telephone number is (571) 272-8032. The examiner can normally be reached on 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on (571)272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3729

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LRC 06/07/2006



**A. DEXTER TUGBANG**  
**PRIMARY EXAMINER**